FLOW, AURORA AND PI2 ASSOCIATIONS OBSERVED BY THEMIS

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It has been known for decades that auroral substorm onset occurs on (or at least near) the most equatorward auroral arc, which is thought to map to the near geosynchronous region. The lack of auroral signatures poleward of this arc prior to onset has been a major criticism of flow-burst driven models of substorm onset. The combined THEMIS 5 spacecraft in-situ and ground array measurements provide an unprecedented opportunity to examine the causal relationship between midtail plasma flows, aurora, and ground magnetic signatures. I first present an event from 2008 using multi-spectral all sky imager data from Gillam and in-situ data from THEMIS. The multispectral data indicate an equatorward moving auroral form prior to substorm onset. When this forms reaches the most equatorward arc, the arc brightens and an auroral substorm begins. The THEMIS data show fast Earthward flows prior to onset as well. I suggest that the results strongly support flow-burst driven models of magnetospheric activity. I discuss further the association of flow bursts and Pi2 pulsations, and discuss the possibility of using Pi2 waveforms to infer midtail reconnection dynamics.